

# PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum) P14301WO

### Box No. I TITLE OF INVENTION

Frequency Content Separation Using Complex Frequency Shifting Converters

### Box No. II APPLICANT

☐ This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

R. F. Engines Limited  
Innovation Centre  
St Cross Business Park  
Newport  
Isle of Wight, PO30 1NY

Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality:  
GB

State (that is, country) of residence:  
GB

This person is applicant for the purposes of:

☐ all designated States

☒ all designated States except the United States of America

☐ the United States of America only

☐ the States indicated in the Supplemental Box

### Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

LILLINGTON, John  
Seymour House  
19 Nodgham Lane  
Carisbrooke  
Isle of Wight, PO30 1NY

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:  
GB

State (that is, country) of residence:  
GB

This person is applicant for the purposes of:

☐ all designated States

☐ all designated States except the United States of America

☒ the United States of America only

☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

### Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

ROBINSON, Nigel Alexander Julian et al  
D Young & Co  
21 New Fetter Lane  
London  
EC4A 1DA  
ENGLAND

Telephone No.

+44 23 8071 9500

Facsimile No.

+44 23 8071 9800

Teleprinter No.

477667 YOUNGS G

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)***If none of the following sub-boxes is used, this sheet should not be included in the request.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

**RUSSO, Antonio Renato**  
**Flat 7 Maritime Chambers**  
**82 Canute Road**  
**Southampton**  
**SO14 3AB**

This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

Italian/French

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☒ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

**Box No. V DESIGNATION OF STATES**

Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

**Regional Patent**

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, BG Bulgaria, CH & LI Switzerland and Liechtenstein, CY Cyprus, CZ Czech Republic, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, SI Slovenia, SK Slovakia, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....

**National Patent** (if other kind of protection or treatment desired, specify on dotted line):

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> AE United Arab Emirates .....               | <input checked="" type="checkbox"/> GM Gambia .....                                    | <input checked="" type="checkbox"/> NZ New Zealand .....                      |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda .....                | <input checked="" type="checkbox"/> HR Croatia .....                                   | <input checked="" type="checkbox"/> OM Oman .....                             |
| <input checked="" type="checkbox"/> AL Albania .....                            | <input checked="" type="checkbox"/> HU Hungary .....                                   | <input checked="" type="checkbox"/> PH Philippines .....                      |
| <input checked="" type="checkbox"/> AM Armenia .....                            | <input checked="" type="checkbox"/> ID Indonesia .....                                 | <input checked="" type="checkbox"/> PL Poland .....                           |
| <input checked="" type="checkbox"/> AT Austria .....                            | <input checked="" type="checkbox"/> IL Israel .....                                    | <input checked="" type="checkbox"/> PT Portugal .....                         |
| <input checked="" type="checkbox"/> AU Australia .....                          | <input checked="" type="checkbox"/> IN India .....                                     | <input checked="" type="checkbox"/> RO Romania .....                          |
| <input checked="" type="checkbox"/> AZ Azerbaijan .....                         | <input checked="" type="checkbox"/> IS Iceland .....                                   | <input checked="" type="checkbox"/> RU Russian Federation .....               |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina .....             | <input checked="" type="checkbox"/> JP Japan .....                                     |   |
| <input checked="" type="checkbox"/> BB Barbados .....                           | <input checked="" type="checkbox"/> KE Kenya .....                                     | <input checked="" type="checkbox"/> SC Seychelles .....                       |
| <input checked="" type="checkbox"/> BG Bulgaria .....                           | <input checked="" type="checkbox"/> KG Kyrgyzstan .....                                | <input checked="" type="checkbox"/> SD Sudan .....                            |
| <input checked="" type="checkbox"/> BR Brazil .....                             | <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea .....     | <input checked="" type="checkbox"/> SE Sweden .....                           |
| <input checked="" type="checkbox"/> BY Belarus .....                            | <input checked="" type="checkbox"/> KR Republic of Korea .....                         | <input checked="" type="checkbox"/> SG Singapore .....                        |
| <input checked="" type="checkbox"/> BZ Belize .....                             | <input checked="" type="checkbox"/> KZ Kazakhstan .....                                | <input checked="" type="checkbox"/> SK Slovakia .....                         |
| <input checked="" type="checkbox"/> CA Canada .....                             | <input checked="" type="checkbox"/> LC Saint Lucia .....                               | <input checked="" type="checkbox"/> SL Sierra Leone .....                     |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein ..... | <input checked="" type="checkbox"/> LK Sri Lanka .....                                 | <input checked="" type="checkbox"/> TJ Tajikistan .....                       |
| <input checked="" type="checkbox"/> CN China .....                              | <input checked="" type="checkbox"/> LR Liberia .....                                   | <input checked="" type="checkbox"/> TM Turkmenistan .....                     |
| <input checked="" type="checkbox"/> CO Colombia .....                           | <input checked="" type="checkbox"/> LS Lesotho .....                                   | <input checked="" type="checkbox"/> TN Tunisia .....                          |
| <input checked="" type="checkbox"/> CR Costa Rica .....                         | <input checked="" type="checkbox"/> LT Lithuania .....                                 | <input checked="" type="checkbox"/> TR Turkey .....                           |
| <input checked="" type="checkbox"/> CU Cuba .....                               | <input checked="" type="checkbox"/> LU Luxembourg .....                                | <input checked="" type="checkbox"/> TT Trinidad and Tobago .....              |
| <input checked="" type="checkbox"/> CZ Czech Republic .....                     | <input checked="" type="checkbox"/> LV Latvia .....                                    |   |
| <input checked="" type="checkbox"/> DE Germany .....                            | <input checked="" type="checkbox"/> MA Morocco .....                                   | <input checked="" type="checkbox"/> TZ United Republic of Tanzania .....      |
| <input checked="" type="checkbox"/> DK Denmark .....                            | <input checked="" type="checkbox"/> MD Republic of Moldova .....                       | <input checked="" type="checkbox"/> UA Ukraine .....                          |
| <input checked="" type="checkbox"/> DM Dominica .....                           | <input checked="" type="checkbox"/> MG Madagascar .....                                | <input checked="" type="checkbox"/> UG Uganda .....                           |
| <input checked="" type="checkbox"/> DZ Algeria .....                            | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia ..... | <input checked="" type="checkbox"/> US United States of America .....         |
| <input checked="" type="checkbox"/> EC Ecuador .....                            | <input checked="" type="checkbox"/> MN Mongolia .....                                  |   |
| <input checked="" type="checkbox"/> EE Estonia .....                            | <input checked="" type="checkbox"/> MW Malawi .....                                    | <input checked="" type="checkbox"/> UZ Uzbekistan .....                       |
| <input checked="" type="checkbox"/> ES Spain .....                              | <input checked="" type="checkbox"/> MX Mexico .....                                    | <input checked="" type="checkbox"/> VC Saint Vincent and the Grenadines ..... |
| <input checked="" type="checkbox"/> FI Finland .....                            | <input checked="" type="checkbox"/> MZ Mozambique .....                                | <input checked="" type="checkbox"/> VN Viet Nam .....                         |
| <input checked="" type="checkbox"/> GB United Kingdom .....                     | <input checked="" type="checkbox"/> NO Norway .....                                    | <input checked="" type="checkbox"/> YU Yugoslavia .....                       |
| <input checked="" type="checkbox"/> GD Grenada .....                            |  | <input checked="" type="checkbox"/> ZA South Africa .....                     |
| <input checked="" type="checkbox"/> GE Georgia .....                            |  | <input checked="" type="checkbox"/> ZM Zambia .....                           |
| <input checked="" type="checkbox"/> GH Ghana .....                              |  | <input checked="" type="checkbox"/> ZW Zimbabwe .....                         |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

- ☒ NI Nicaragua .....
- ☒ PG Papua New Guinea .....
- ☐ SY Syrian Arab Republic .....
- ☐ .....

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

<b>Box No. VI PRIORITY CLAIM</b>				
The priority of the following earlier application(s) is hereby claimed:				
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application:* regional Office	international application: receiving Office
item (1) 4 July 2002	0215502.6	GB		
item (2)				
item (3)				
item (4)				
item (5)				
<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.				
The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as: <input checked="" type="checkbox"/> all items <input type="checkbox"/> item (1) <input type="checkbox"/> item (2) <input type="checkbox"/> item (3) <input type="checkbox"/> item (4) <input type="checkbox"/> item (5) <input type="checkbox"/> other, see Supplemental Box				
* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)): . . .				
<b>Box No. VII INTERNATIONAL SEARCHING AUTHORITY</b>				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used): ISA / .....				
Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority): Date (day/month/year)                      Number                      Country (or regional Office)				
<b>Box No. VIII DECLARATIONS</b>				
The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):				Number of declarations
<input type="checkbox"/> Box No. VIII (i)	Declaration as to the identity of the inventor			:
<input type="checkbox"/> Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent			:
<input type="checkbox"/> Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application			:
<input type="checkbox"/> Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)			:
<input type="checkbox"/> Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty			:

**Box No. IX CHECK LIST; LANGUAGE OF FILING**

This international application contains:

(a) **in paper form**, the following number of sheets:

request (including declaration sheets) : 5  
description (excluding sequence listings and/or tables related thereto) : 16  
claims : 3  
abstract : 1  
drawings : 25

**Sub-total number of sheets** : 50

sequence listings :  
tables related thereto :

*(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)*
**Total number of sheets** : 50

(b) ☐ **only in computer readable form** (Section 801(a)(i))

- (i) ☐ sequence listings  
(ii) ☐ tables related thereto

(c) ☐ **also in computer readable form** (Section 801(a)(ii))

- (i) ☐ sequence listings  
(ii) ☐ tables related thereto

**Type and number of carriers** (diskette, CD-ROM, CD-R or other) on which are contained the

- ☐ sequence listings: .....  
☐ tables related thereto: .....

*(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)*

This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):

1. ☒ fee calculation sheet : .....
2. ☐ original separate power of attorney : .....
3. ☐ original general power of attorney : .....
4. ☐ copy of general power of attorney; reference number, if any: ..... : .....
5. ☐ statement explaining lack of signature : .....
6. ☐ priority document(s) identified in Box No. VI as item(s): ..... : .....
7. ☐ translation of international application into (language): ..... : .....
8. ☐ separate indications concerning deposited microorganism or other biological material : .....
9. ☐ sequence listings in computer readable form (indicate type and number of carriers) : .....
- (i) ☐ copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) : .....
- (ii) ☐ (only where check-box (b)(i) or (c)(i) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter : .....
- (iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listings mentioned in left column : .....
10. ☐ tables in computer readable form related to sequence listings (indicate type and number of carriers) : .....
- (i) ☐ copy submitted for the purposes of international search under Section 802(b-quater) only (and not as part of the international application) : .....
- (ii) ☐ (only where check-box (b)(ii) or (c)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Section 802(b-quater) : .....
- (iii) ☐ together with relevant statement as to the identity of the copy or copies with the tables mentioned in left column : .....
11. ☐ other (specify): ..... : .....

Number of items

**Figure of the drawings** which should accompany the abstract: 6A

**Language of filing** of the international application: English

**Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE**

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

N A J Robinson

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings: <input type="checkbox"/> received:  <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

This sheet is not part of and does not count as a sheet of the international application.

**PCT**

**FEE CALCULATION SHEET**

**Annex to the Request**

For receiving Office use only

International Application No.

Date stamp of the receiving Office

Applicant's or agent's  
file reference

P14301WO

Applicant

R. F. Engines Limited

**CALCULATION OF PRESCRIBED FEES**

1. TRANSMITTAL FEE . . . . . UK£ 55.00 T

2. SEARCH FEE . . . . . UK£ 592.00 S

International search to be carried out by

(If two or more International Searching Authorities are competent to carry out the international search, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

**Basic Fee**

Where items (b) and/or (c) of Box No. IX apply, enter Sub-total number of sheets } 50

Where items (b) and (c) of Box No. IX do not apply, enter Total number of sheets }

b1 first 30 sheets . . . . . UK£ 278.00 b1

b2 20 x UK£ 6.00 = UK£ 120.00 b2  
number of sheets fee per sheet  
in excess of 30

b3 additional component (only if sequence listings and/or tables related  
thereto are filed in computer readable form under Section 801(a)(i),  
or both in that form and on paper, under Section 801(a)(ii):

x UK£ 6.00 = UK£ 0.00 b3  
fee per sheet

Add amounts entered at b1, b2 and b3 and enter total at B . . . . . UK£ 398.00 B

**Designation Fees**

The international application contains ALL designations.

5 x UK£ 60.00 = UK£ 300.00 D  
number of designation fees amount of designation fee  
payable (maximum 5)

Add amounts entered at B and D and enter total at I . . . . . UK£ 698.00 I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT (if applicable) . . . . . UK£ 22.00 P

5. TOTAL FEES PAYABLE . . . . . UK£ 1,367.00

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

TOTAL

☐ The designation fees are not paid at this time.

**MODE OF PAYMENT**

☒ authorization to charge  
deposit account (see below)

☐ postal money order

☐ cash

☐ coupons

☐ cheque

☐ bank draft

☐ revenue stamps

☐ other (specify):

**AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT**

(This mode of payment may not be available at all receiving Offices)

☒ Authorization to charge the total fees indicated above.

☒ (This check-box may be marked only if the conditions for deposit accounts  
of the receiving Office so permit) Authorization to charge any deficiency  
or credit any overpayment in the total fees indicated above.

☒ Authorization to charge the fee for priority document.

Receiving Office: RO/ UKPO

Deposit Account No.: D02246

Date: 1 July 2003

Name: Nigel Robinson

Signature: